

## UMBILICAL CORD STEM CELL BANKING: NEED AND SCOPE

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### ABSTRACT

*There are some important stages in a person's life. Giving birth to the child is the most wonderful and breathtaking moment in each mother's life. Most of the mothers start getting ready for the welcome of a baby as soon as they became pregnant. On the day of delivery, they will be overcome with the dreams of the future with their child's first smiles, grasping and developmental milestones. Their child ever becoming seriously ill will probably be the closing thing on their mind. But sometimes they consider the possibility that a serious illness might someday affect their child and they make a choice on the delivery day that might impact the future health of that child or even their other children by deciding to bank their newborn's cord blood.*

**KEYWORDS:** *Umbilical Cord, Stem Cells, Stem Cell Banking, Cord Blood, Antenatal Mothers.*

### Introduction

An umbilical cord is a lifeline between the mother and the child. It fulfills the nutritional need of the unborn baby while it is still in the womb. It is connected to the baby at the position that is later called the belly button. It is connected to the mother's placenta during pregnancy. After the birth of the baby, the umbilical cord is cut. Some blood remains in the blood vessels of the placenta that is no longer needed by the baby. This blood is called placental blood or umbilical cord blood & is short called cord blood. Cord blood contains all the normal blood elements - red blood cells, white blood cells, platelets, and plasma. But it is also rich in hematopoietic (blood-forming) stem cells, similar to those found in the bone marrow. That is the reason for the use of cord blood for transplantation as an alternative to bone marrow.

The Researcher discovered in the 1970s that umbilical cord blood could supply the same kinds of blood-forming (hematopoietic) stem cells as a bone marrow donor. And so, umbilical cord stem cells began to be collected and stored. At an increasing rate, pregnant mothers are storing cord blood for their families, not only as a potentially life-saving resource for current uses of stem cells but also for their future potentials as it is a once in a lifetime opportunity which occurs only at birth. More than 45 diseases have been treated now using cord blood stem cells. These include malignant diseases like leukemia, lymphoma, neuroblastoma, and retinoblastoma, and several other non-malignant diseases as well. Non-malignant diseases are primarily genetic disorders of the blood and immune systems.

In the year 2009, there have been over 15,000 cord blood stem cell transplants worldwide. More than one half of all stem cell transplants from unrelated donors in children now use cord blood in the United States. In Japan, this is true for adults as well. This program has provided cord blood units for transplantation to over 3,500 recipients to date, about one fourth of all cord blood transplants from unrelated donors. Approximately 72,000 births daily in India which results in discarding 72,000 umbilical cords a day. The storage of stem cell rich blood derived from these umbilical cords can prove to be the best possible insurance against dangerous diseases. Hence Mothers should improve the knowledge of umbilical cord stem cell banking and its importance to treat many diseases and save the children's life.

### Need & Scope for the Research

Cord blood is a biological safeguard against diseases. The umbilical cord blood is a rich source of stem cells that can be derived from two sources: cord blood and cord tissue. The stem cells derived from the cord blood are called hematopoietic stem cells that have immense potential in curing blood-related disorders like blood cancer, thalassemia, etc. The cells derived from the cord tissue are

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called Mesenchymal stem cells that can be useful in treating tissue related disorders. The researcher also figures out that cord blood stem cells could be used to rejuvenate a damaged immune system, making them nearly as adaptable as embryonic stem cells for treating such immune disorders.

Stem cell therapy cracks new records that stem cells derived from the umbilical cord blood are proving to be such a benefaction to stem cell therapy; it is natural that the future of storage of umbilical cord blood is gaining momentum. Thus, so called, stem cell banking is being touted as life coverage. However, studies have shown that siblings have up to 75% chances of compatibility, and the cord blood may even be a match for parents and grandparents up to 50%. In 1995 a total of 320 centers worldwide had more than 66,000 transplants.

As there is the increasing number of options regarding the collection and banking of umbilical cord blood, more pregnant women are likely to be asked to make the decision about stem cell banking. A study found that, while feeling confident in making an anticipatory decision about cord blood banking, women expressed a clear desire to learn much more about the collection, storage, and use of stem cell banking. Approximately 25,000 cord blood units had been preserved over the last three years in India. With more than 80,000 births per day or 26 million births a year, India is poised to be the largest source for umbilical cord blood in the world.

With the emergence of umbilical cord blood banking, a former waste product of birth has been transformed into a valuable lifesaving resource. Mothers have a unique opportunity to help educate expectant parents about their options regarding cord blood stem cell preservation. Families should be educated about their options at least three-months before delivery so they can make an informed decision about their baby's cord blood stem cells. These studies have proved that mothers do not have enough knowledge about cord blood banking and they expect their health professionals to give adequate information regarding cord blood banking. Therefore it's a necessity to make aware mothers about cord blood banking.

The researcher felt that there is a great need to improve knowledge regarding stem cell banking among antenatal mothers. This will be a gift to the society by contributing to the advancement of Medicare and saving more lives. So, by the above statements and previous clinical experience, to impart scientific information on stem cell banking the investigator rightly justifies the need for stem cell banking and the study enhances the knowledge for stem cell banking.

#### **Problem Statement**

A Study to Assess The Knowledge and Attitude Regarding Umbilical Cord Stem Cell Banking Among Antenatal Mothers In Selected Hospitals Jaipur With A View To Develop an Information Booklet.

#### **Objectives of the Study**

- To assess the level of knowledge regarding umbilical cord stem cell banking among antenatal mothers.
- To assess the attitude regarding umbilical cord stem cell banking among antenatal mothers.
- To find out the association between the level of knowledge and attitude of antenatal mothers and selected demographic variables.
- To find out the association between the level of knowledge of antenatal mothers and selected demographic variables.
- To find out the association between the level of knowledge of antenatal mothers and selected demographic variables.
- To develop an information booklet.

#### **Operational Definitions**

- **Knowledge:** in this study, knowledge refers to the response of antenatal mothers to the item of the questionnaire regarding umbilical cord stem cell banking.
- **Attitude:** In this study, it refers to the ideas, views, values, and opinions of antenatal mothers regarding umbilical cord stem cell banking.
- **Umbilical Cord:** a flexible cordlike structure containing blood vessels and attaching fetus to the placenta during gestation in the mother's womb.
- **Stem cell:** In the present study, it refers to the unspecialized cells that have the ability to differentiate into other cells and the ability to produce more stem cells.

- **Stem Cell Banking:** Umbilical Cord Stem Cell Banking is the process of extracting, processing & storing your newborn's cord blood stem cells in a repository.
- **Antenatal Mothers:** it refers to the mothers who are pregnant and having educational qualifications graduate and above.
- **Selected hospitals:** in the present study, selected hospital refers to the maternity hospital in Jaipur City.
- **Information Booklet:** in this study, it refers to the booklet which contains important information regarding stem cell banking to improve the knowledge among antenatal mothers.

### Hypotheses

- H<sub>1</sub>:** There will be a significant association between the level of knowledge and attitude among antenatal mothers regarding umbilical cord stem cell banking.
- H<sub>01</sub>:** There will be no significant association between the level of knowledge and attitude among antenatal mothers regarding umbilical cord stem cell banking.
- H<sub>2</sub>:** There will be a significant association between the level of knowledge among antenatal mothers regarding umbilical cord stem cell banking and selected demographic variables.
- H<sub>02</sub>:** There will be no significant association between the level of knowledge among antenatal mothers regarding umbilical cord stem cell banking and selected demographic variables.
- H<sub>3</sub>:** There will be a significant association between the attitude among antenatal mothers regarding umbilical cord stem cell banking and selected demographic variables.
- H<sub>03</sub>:** There will be no significant association between the attitude among antenatal mothers regarding umbilical cord stem cell banking and selected demographic variables.

### Assumptions

- Antenatal mothers may have inadequate knowledge regarding umbilical cord stem cell banking.
- Antenatal mothers may have poor attitude regarding umbilical cord stem cell banking.
- The selected demographic variables may have an influence on the existing level of knowledge and attitude regarding umbilical cord stem cell banking.
- Antenatal mothers will have the interest to know about the benefits of umbilical cord stem cell banking.
- An Information booklet distribution among antenatal mothers may enhance the knowledge regarding umbilical cord stem cell banking to change their attitude.

### Conceptual Framework

In this study, the investigator has applied Noel J. Pender's Health Promotion Model (1987). The health promotion model is directed to increase a client's level of well-being. This study is aimed to assess the knowledge of antenatal mothers regarding umbilical cord stem cell banking. The conceptual framework for the present study was developed on the bases of Pender's 'Health Promotion Model' (1996). This model is based on four factors:

- **Individual Characteristics**

The researcher in this study has considered that the individual characteristics are influenced by certain demographic factors or variables such as age, religion, occupation, education, family income, Gravida, & source of information. The prior related behaviors include previous experience, knowledge, unawareness, poor family practice and traditional beliefs.

- **Cognitive Perceptual Factors**

The researcher in this study has considered that each mother has certain perceptions towards stem cell banking which is influenced by certain factors such as mass media campaigns, advice from others, individualized health teaching, and also there may be perception regarding barriers of stem cell banking, which is influenced by factors such as family practices, religious beliefs, advice from others etc.

- **Likelihood of Action**

In this study, the researcher is expected to assess the knowledge and attitude of antenatal mothers on stem cell banking using a structured questionnaire and attitude scale. An information booklet on stem cell banking is developed and distributed among mothers in order to improve their knowledge regarding stem cell banking.

• **Behavioral Outcome**

In the present study, the level of knowledge is assessed and information booklet is distributed among mothers to improve their further knowledge on stem cell banking and the gain in knowledge will be assessed by administration of the same knowledge questionnaire, which is not included in the study.

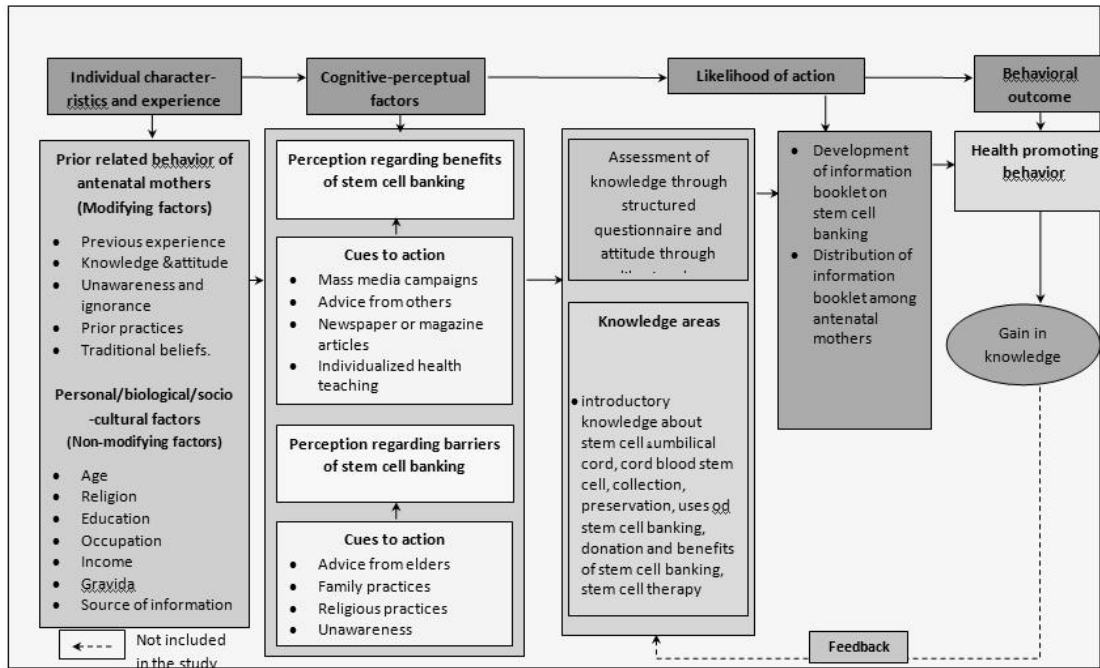


Figure 1: Modified Conceptual framework based on Pender's Health Promotion Model (1996)

**Conclusion**

Before Twenty years, only one disease could be treated with umbilical cord stem cells; ten years ago solely a few. Today, umbilical cord stem cells have been successfully used in the treatment of more than 80 life-threatening diseases (primarily blood diseases). The amazing speed of research and clinical trials using umbilical cord stem cells has led to diseases being treated that no one could have predicted. Many of these new treatments use the patient's own stem cells.

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